

Application No.: 10/707, 707

Docket No.: 11809-US-PA

**REMARKS****Present Status of the Application**

Claims 1-22 are pending of which claims 1, 4-6, 9, 13-14, 16 and 19-20 have been amended in order to more explicitly describe the claimed invention. Amendment to Claims 1, 9, and 13 are fully supported in paragraphs [0032] and [0042] respectively. Further, Applicants also amended the specification to correct some minor typographical errors. It is believed that no new matter adds by way of amendments made to claims or otherwise to the application. For at least the foregoing reason, Applicants respectfully submit that claims 1-22 patently define over prior arts of record and reconsideration of this application is respectfully requested.

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Discussion of Objections to Specification

*The Office Action Objected to Specification because the Specification include some minor typographical errors, which needs to be corrected.*

In response thereto, Applicants would like to thank the Examiner for pointing out the errors and accordingly corrected the typographical errors. Reconsideration is respectfully requested.

Discussion of the claim rejection under 35 USC 112

*The Office Action rejected claims 4, 5, 6, 14, 16, 19 and 20 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.*

In response thereto, Applicants would like to thank the Examiner for pointing out the errors and accordingly amended the claims 4, 5, 6, 14, 16, 19 and 20. Reconsideration is respectfully requested.

Discussion of the claim rejection under 35 USC 103

*1. The Office Action rejected claims 1-3, 5, 7 and 8 under 35 USC 103(a) as being unpatentable over Sung et al. (US 2003/0032224 hereinafter Sung) in view of Willer (US 6,674, 132 B2, hereinafter Willer).*

*In rejecting the above claims, the Examiner stated that Sung teaches every features of the claimed invention except that Sung lacks anticipation in not teaching an antireflection layer covering the stacked surface on top and that an oxide layer is*

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*formed on an exposed surface of the control gate. However, the Examiner stated that Willer discloses a method of fabricating non-volatile memory (Figures 1-4 and accompanying text), wherein Willer shows an antireflection layer 7 over a stacked structure having a control gate 5, 6, a barrier layer 4, a trapping layer 3 and a tunneling layer 2 (Fig. 3, col. 6, lines 44-61 and col. 7, lines 12-26), and an oxide layer formed on an exposed surface of the control gate (Fig. 3, col. 7, lines 27-35). The antireflection layer includes inorganic material (col. 6, lines 59-61).*

*One having ordinary skill in the art, at the time the invention was made, would have been motivated to modify Sung in view of Willer by forming an antireflection layer 7 on a stacked structure and forming an oxide layer on an exposed surface of the control gate, as taught by Willer, because: forming an antireflection layer on the stacked structure prior to patterning the stacked structure reduces the standing wave effect, which occurs when actinic light waves propagate through a resist film down to the substrate, and are reflected back up through the resist, and forming an oxide layer on the exposed surface of the control gate 214 in Sung protects the gate during a subsequent etching step to form the sidewall spacers 216.*

**Applicants respectfully disagree and traverse the above rejections as set forth below. Independent claim 1, as amended, is allowable for at least the reason that Sung and Willer substantially fail to teach, suggest or disclose each and every features of amended independent claim 1. More specifically, Sung and Willer fail to teach, suggest or disclose a method of fabricating a non-volatile memory process comprising at least a step of [performing a plasma enhanced chemical vapor deposition process to form an ultraviolet-resistant lining layer over the surface of the stacked structure,**

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wherein the ultraviolet-resistant lining layer can effectively resist ultraviolet light] as required by the amended claim 1. Instead, Sung substantially teaches a step of forming a protective layer (220), such as a silicon nitride layer or silicon oxy-nitride layer, (for example, please see page 2, paragraph [0018], lines 9-14) for protecting the NROM from ultra-violet light and plasma. However, Sung fails to disclose a step of performing PECVD to form the protective layer (220). Likewise, Willer also fails to teach, suggest or disclose a step of performing a PECVD process to form a protective layer to cover the non-volatile memory, wherein the protective layer is formed by using PECVD process. Thus, neither Sung nor Willer teach, suggest or disclose each and every feature of the proposed amended independent claim 1.

Claims 2-3, 5, 7 and 8, which depend from independent Claim 1, directly or indirectly, are also patentable over Sung and Willer, at least because of their dependency from an allowable base claim.

For at least the foregoing reasons, Applicants respectfully submit that claims 1-3, 5, 7 and 8 patently define over Sung and Willer, and therefore should be allowed. Reconsideration and withdrawal of the above rejections is respectfully requested.

*2. The Office Action rejected claim 4 under 35 USC 103(a) as being unpatentable over Sung in view of Willer as applied to claim 3 above, and in further view of Bhattacharyya et al. (US 6,643, 681B2, hereinafter Bhattacharyya).*

Applicants respectfully disagree and would like to point out that even though the Examiner relied upon Bhattacharyya to disclose a PECVD process using a reacting gas including SiH<sub>4</sub> gas, NH<sub>3</sub> gas and N<sub>2</sub> gas, still Bhattacharyya cannot cure the specific deficiencies of Sung and Willer as substantially discussed with respect to

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amended independent claim 1 above. More specifically, Bhattacharyya fails to teach, suggest or disclose that a silicon-rich nitride layer can effectively resist ultraviolet light. Accordingly, Applicants respectfully submit that claim 4 also patently defines over Sung, Willer and Bhattacharyya for at least the same reason as well. Reconsideration is respectfully requested.

*3. The Office Action rejected claim 6 under 35 USC 103(a) as being unpatentable over Sung in view of Willer as applied to claim 1 above, and in further view of Gupta et al. (US 5,910,453, hereinafter Gupta).*

Applicants respectfully disagree and would like to point out that even though the Examiner relied upon Gupta to disclose organic antireflection layer (14) in a patterning process, still Gupta cannot cure the specific deficiencies of Sung and Willer as substantially discussed with respect to amended independent claim 1 above. Accordingly, Applicants respectfully submit that claim 6 also patently defines over Sung, Willer and Gupta for at least the same reason as well. Reconsideration is respectfully requested.

*4. The Office Action rejected claim 7 under 35 USC 103(a) as being unpatentable over Sung in view of Willer as applied to claim 1 above, and in further view of Wolf et al. (Silicon Processing for the VLSI Era – Vo. 1: Process Technology, hereinafter Wolf).*

Applicants respectfully disagree and would like to point out that even though the Examiner relied upon Wolf to disclose a thermal oxidation process for forming an oxide layer, still Wolf cannot cure the specific deficiencies of Sung and Willer as

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substantially discussed with respect to amended independent claim 1 above. Accordingly, Applicants respectfully submit that claim 7 also patently defines over Sung, Willer and Wolf for at least the same reason as well. Reconsideration is respectfully requested.

*5. The Office Action rejected claims 9, 10 and 12 under 35 USC 103(a) as being unpatentable over Sung in view of Noguchi et al. (US 2004/0094793, hereinafter Noguchi).*

Applicants respectfully disagree and traverse the above rejections as set forth below. Independent claim 9, as amended, is allowable for at least the reason that Sung and Noguchi substantially fail to teach, suggest or disclose each and every features of amended independent claim 1. More specifically, Sung and Noguchi fail to teach, suggest or disclose a method of fabricating a non-volatile memory and metal interconnect process comprising at least a step of [performing a plasma enhanced chemical vapor deposition process to form a low surface charge lining layer for covering the patterned conducting line structure, wherein the low surface charge lining layer can effectively resist ultraviolet light] as required by the amended claim 9.

There is no disclosure equivalent of showing, both in Sung (please see FIG. 3) and Noguchi (please see Figs. 1, 2, 6-9), a low surface charge layer covering the patterned conducting line structure, instead Sung substantially shows that the patterned metal layer is exposed or not covered by any layers, and whereas, Noguchi substantially, in Fig. 1, on page 4, paragraph [0059], shows that the metal wire 15, which is not patterned is being covered by a HDP silicon oxide layer (16). Accordingly,

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Applicants respectfully submit that no combination of Sung and Noguchi in a manner suggested by the Examiner could possibly render the amended claim 9 obvious.

In other words, both Sung and Noguchi fail to teach, suggest or disclose a step of performing a PECVD process to form a low surface charge lining layer covering the patterned conducting line structure. Thus, neither Sung nor Willer either alone or in combination teach, suggest or disclose each and every feature of the proposed amended independent claim 9.

Claims 10 and 12, which depend from independent Claim 9, directly or indirectly, are also patentable over Sung and Noguchi, at least because of their dependency from an allowable base claim.

For at least the foregoing reasons, Applicants respectfully submit that claims 9, 10 and 12 patently define over Sung and Noguchi, and therefore should be allowed. Reconsideration and withdrawal of the above rejections is respectfully requested.

*6. The Office Action rejected claim 11 under 35 USC 103(a) as being unpatentable over Sung in view of Noguchi as applied to claim 9 above, and in further view of Wolf.*

Applicants respectfully disagree and would like to point out that Noguchi substantially discloses, in FIG. 1, a metal wire 15 is covered by a second insulating ( $\text{SiO}_2$ ) layer (16). Furthermore, Wolf discloses, on page 184 that the PECVD oxides have good adhesion to metal. Therefore, the PECVD process of Wolf cannot possible include a reacting gas including a  $\text{SiH}_4$  gas and nitrous oxide gas, because  $\text{SiH}_4$  gas and nitrous oxide gas are used for forming silicon nitride layers. In other words, Wolf

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fails to teach, suggest or disclose a PECVD process using  $\text{SiH}_4$  gas and nitrous oxide gas mixture, instead teaches a PECVD process to form a silicon oxide layer. Accordingly, Applicants respectfully submit that claim 11 also patently defines over Sung, Noguchi and Wolf as well. Reconsideration is respectfully requested.

*7. The Office Action rejected claims 13-15, 17, 19 and 22 under 35 USC 103(a) as being unpatentable over Sung in view of Willer and Noguchi.*

Applicants respectfully disagree and would like to point out that the independent claim 13 has been amended to recite the features of claim 1. Accordingly, for at least the same reasons discussed in subsections 1 with respect to claim 1 above, Applicants respectfully submit that the prior arts of record, neither alone nor in combination, teach, suggest or disclose every features of the amended claim 13. More specifically, independent claim 13 has been amended to recite a step of performing a PECVD process to form an ultraviolet resistant lining layer over the stacked structure, wherein the ultraviolet resistant lining layer can effectively resist ultraviolet light. Reconsideration is respectfully requested.

*8. The Office Action rejected claims 16 and 18 under 35 USC 103(a) as being unpatentable over Sung in view of Willer and Noguchi as applied to claims 15 and 17 above, respectively, and further in view of Bhattacharyya.*

Applicants respectfully disagree and would like to point out that even though the Examiner relied upon Bhattacharyya to disclose a PECVD process using a reacting gas including a  $\text{SiH}_4$  gas, an  $\text{NH}_3$  gas and a  $\text{N}_2$  gas, still Bhattacharyya



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cannot cure the specific deficiencies of Sung and Willer as substantially discussed with respect to amended independent claim 13 above. More specifically, Bhattacharyya fails to teach, suggest or disclose that a silicon-rich nitride layer can effectively resist ultraviolet light. Accordingly, Applicants respectfully submit that claim 16 and 18 also patently defines over Sung, Willer and Bhattacharyya for at least the same reason as well. Reconsideration is respectfully requested.

*9. The Office Action rejected claim 20 under 35 USC 103(a) as being unpatentable over Sung in view of Willer and Noguchi as applied to claim 13 above, and further in view of Gupta.*

Applicants respectfully disagree and would like to point out that even though the Examiner relied upon Gupta to disclose organic antireflection layer (14) in a patterning process, still Gupta cannot cure the specific deficiencies of Sung, willer and Noguchi as substantially discussed with respect to amended independent claim 1 above. Accordingly, Applicants respectfully submit that claim 20 also patently defines over Sung, Willer, Noguchi and Gupta for at least the same reason as well. Reconsideration is respectfully requested.

*10. The Office Action rejected claim 21 under 35 USC 103(a) as being unpatentable over Sung in view of Willer and Noguchi as applied to claim 13 above, and further in view of Wolf.*

Applicants respectfully disagree and would like to point out that even though the Examiner relied upon Wolf to disclose a thermal oxidation process for forming an

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oxide layer, still Wolf cannot cure the specific deficiencies of Sung, Willer and Noguchi as substantially discussed with respect to amended independent claim 1 above. Accordingly, Applicants respectfully submit that claim 7 also patently defines over Sung, Willer, Noguchi and Wolf for at least the same reason as well. Reconsideration is respectfully requested.

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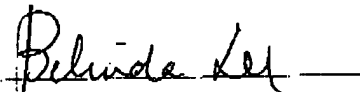
**CONCLUSION**

For at least the foregoing reasons, it is believed that all the pending claims 1-22 of the present application patently define over the prior art and are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted

Date :

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